



## ***Shipping and Transport Media***

### **10.1 Product Transport Media**

All semiconductor products must be shipped in some type of handling media. The type used is specific to the type of package, die, or wafer that is to be shipped. The following sections outline the many different types of shipping and handling media that Intel uses and outlines how they can be recycled. This is not inclusive of the many different types of media available, but is meant to show the main types used and some of the methods for using them in the factory floor.

#### **10.1.1 Plastic Tubes**

Plastic shipping and handling tubes are manufactured from polyvinyl chloride (PVC) with an antistatic surfactant treatment. Standard tubes for most package types are translucent and allow visual inspection of units within the tube. Carbon-impregnated, black conductive tubes are available for all parts where required by device or use characteristics.

Tube profiles are designed with minimum clearance over the maximum package dimensions to reduce damage caused by movement of the device within the tube. For some package types, tubes have “riding rails” on which the packages rest while in the tube. The rails protect the fragile leads from touching anything in the tube. PVC tacks, nylon tacks, or rubber plugs are used to retain the units. All tube wall thickness are 0.025 inches to 0.040 inches. [Table 10-1](#) through [Table 10-8](#) show tube dimensions and cross-sections and quantity of packages per tube for most Intel package types. Additional information on new packages should be requested through Intel Field Sales.

**Table 10-1. PLCC Shipping Tube Dimensions (In Inches)**

Lead Type	Cross Section (W x H)	Wall Thickness	Outside Dimensions			Quantity of Packages Per Tube
			Length (L)	Width (W)	Height (H)	
20 L Square		0.030	19.375	0.480	0.263	46
28L Square		0.030	19.375	0.580	0.263	38
44L Square		0.025	19.375	0.780	0.250	26
52L Square		0.030	19.375	0.880	0.263	23
68L Square		0.025	19.375	1.090	0.250	18
28L Rectangular		0.025	19.375	0.480	0.220	30
32L Rectangular		0.025	19.375	0.580	0.220	30
84L Square		0.040	19.375	1.300	0.288	15

**Table 10-2. Cerquad Shipping Tube Dimensions (In Inches)**

Lead Type	Cross Section (W x H)	Wall Thickness	Outside Dimensions			Quantity Per Tube
			Length (L)	Width (W)	Height (H)	
44SQ		0.025	0.200	0.730	11.50	11
52SQ		0.025	0.200	0.820	11.50	11
68SQ		0.030	0.200	1.040	11.50	9
28SQ		0.030	0.200	0.520	11.50	15
32SQ		0.030	0.175	0.530	11.50	12

**Table 10-3. PQFP Shipping Tube Dimensions (In Inches)**

Lead Type	Cross Section (W x H)	Wall Thickness	Outside Dimensions			Quantity Per Tube
			Length (L)	Width (W)	Height (H)	
84L PQFP		0.030	9.50	0.999	0.280	10
100L PQFP		0.030	10.50	1.099	0.280	10
132L PQFP		0.030	12.50	1.299	0.280	10

**Table 10-4. LCC Shipping Tube Dimensions (In Inches)**

Lead Type	Cross Section (W x H)	Wall Thickness	Outside Dimensions			Quantity Per Tube
			Length (L)	Width (W)	Height (H)	
18L		0.025	11.5	0.370	0.165	25
20L		0.025	11.5	0.370	0.165	25
28L		0.025	11.5	0.530	0.165	22
32L		0.025	11.5	0.535	0.207	18
44L		0.025	11.5	0.736	0.180	16
68L Type "A"		0.025	11.5	1.060	0.235	10
68L Type "B"		0.025	11.5	1.060	0.260	10
32L J-Lead Rectangular		0.030	11.5	0.590	0.235	16
32L J-Lead Rectangular EPROM		0.030	11.5	0.600	0.260	16
44L J-Lead Square		0.025	11.5	0.786	0.250	15

Table 10-5. PGA Shipping Tube Dimensions (In Inches)

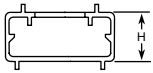
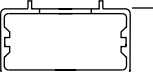
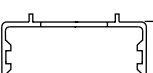
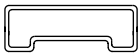
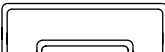
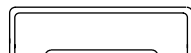
Lead Type	Cross Section (W x H)	Wall Thickness	Outside Dimensions			Quantity Per Tube
			Length (L)	Width (W)	Height (H)	
68L		0.040	20	1.255	0.460	15
88L		0.050	20	1.470	0.720	12
132L		0.045	20	1.565	0.720	11


Table 10-6. Flatpack Shipping Tube Dimensions (In Inches)

Lead Type	Cross Section (W x H)	Wall Thickness	Outside Dimensions			Quantity Per Tube
			Length (L)	Width (W)	Height (H)	
18L* Ceramic		0.020	20	0.810	0.290	18
68L Plastic		0.040	20	2.138	0.628	9
68L Ceramic Quadpack		0.035	20	2.120	0.610	9












**NOTE:**

1. \* Aluminum Tube

Table 10-7. PSOP Shipping Tube Dimensions (In Inches)

Lead Type	Cross Section (W x H)	Wall Thickness	Outside Dimensions			Quantity Per Tube
			Length (L)	Length (L)	Length (L)	
44L		0.030	20	0.787	0.213	17

**Table 10-8. DIP Shipping Tube Dimensions (In Inches)**

Lead Type	Cross Section (W x H)	Wall Thickness	Outside Dimensions			Quantity Per Tube
			Length (L)	Length (L)	Length (L)	
16L		0.020	20	0.600	0.510	24 (P) 23 (D) 23 (C)
18L		0.020	20	0.600	0.510	20 (P) 21 (D), (C)
20L		0.020	20	0.600	0.510	18 (P), (D) 17 (C)
24L (300 mil)		0.020	20	0.600	0.510	15
28L (300 mil)		0.020	20	0.600	0.510	14 (P) 13 (D)
22L (400 mil)		0.030	20	0.727	0.535	17
24L (600 mil)		0.022	20	0.890	0.495	15
28L (600 mil)		0.022	20	0.890	0.495	13
32L		0.022	20	0.890	0.495	11
40L		0.022	20	0.890	0.495	9
48L		0.022	20	0.890	0.495	7 (P) 8 (C)

**NOTES:**

1. (P) = PDIP
2. (C) = Ceramic Solder Brazed
3. (D) = CERDIP

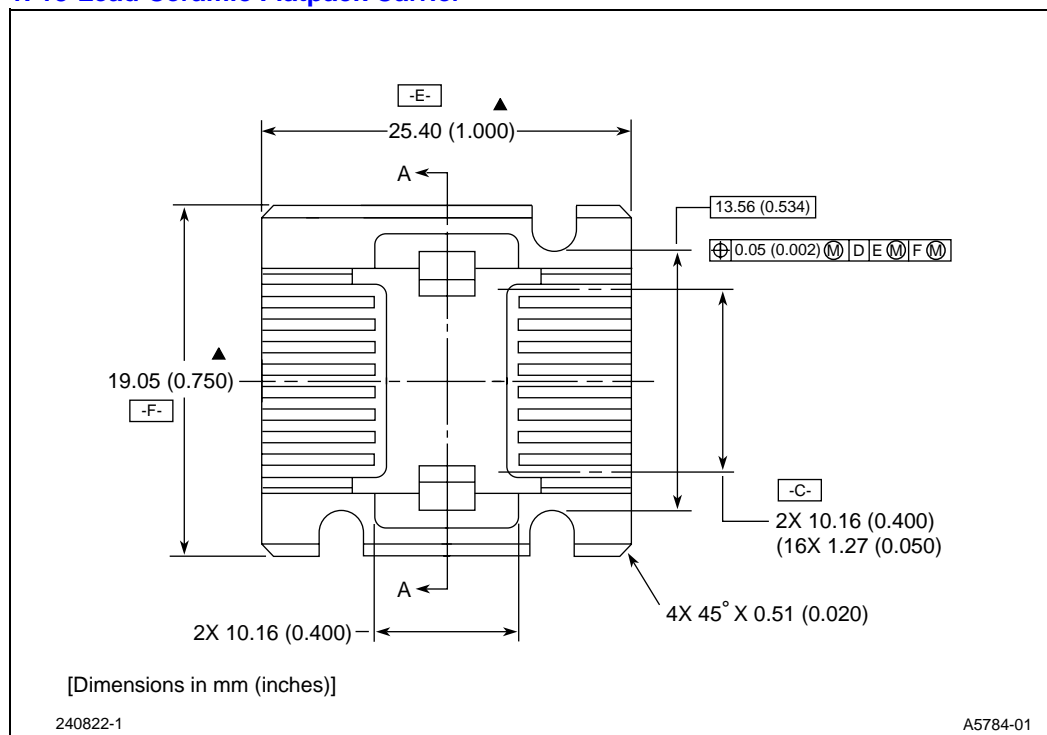
## 10.1.2 Carriers

Additional protection from lead damage is necessary for the fragile leads of flatpack packages, which are shipped flat to be trimmed and formed at the customer site. Plastic carriers are used to hold each unit, then the loaded carrier is placed in the tube. Carriers are either coated with antistatic surface treatment or are intrinsically static dissipative. Figure 10-1 through Figure 10-3 show a variety of carrier types.

### 10.1.2.1 Recycling for Carriers and Carrier Tubes

<b>United Kingdom</b> Holden Environmental Shore Road Recycling Centre Shore Road, Perth PH2 8BH Contact: John Cox Phone: 0500 34 10 40 Fax: 01738 637150	Holden Environmental provides all shipping arrangements at no charge to the customer.
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Figure 10-1. 18-Lead Ceramic Flatpack Carrier



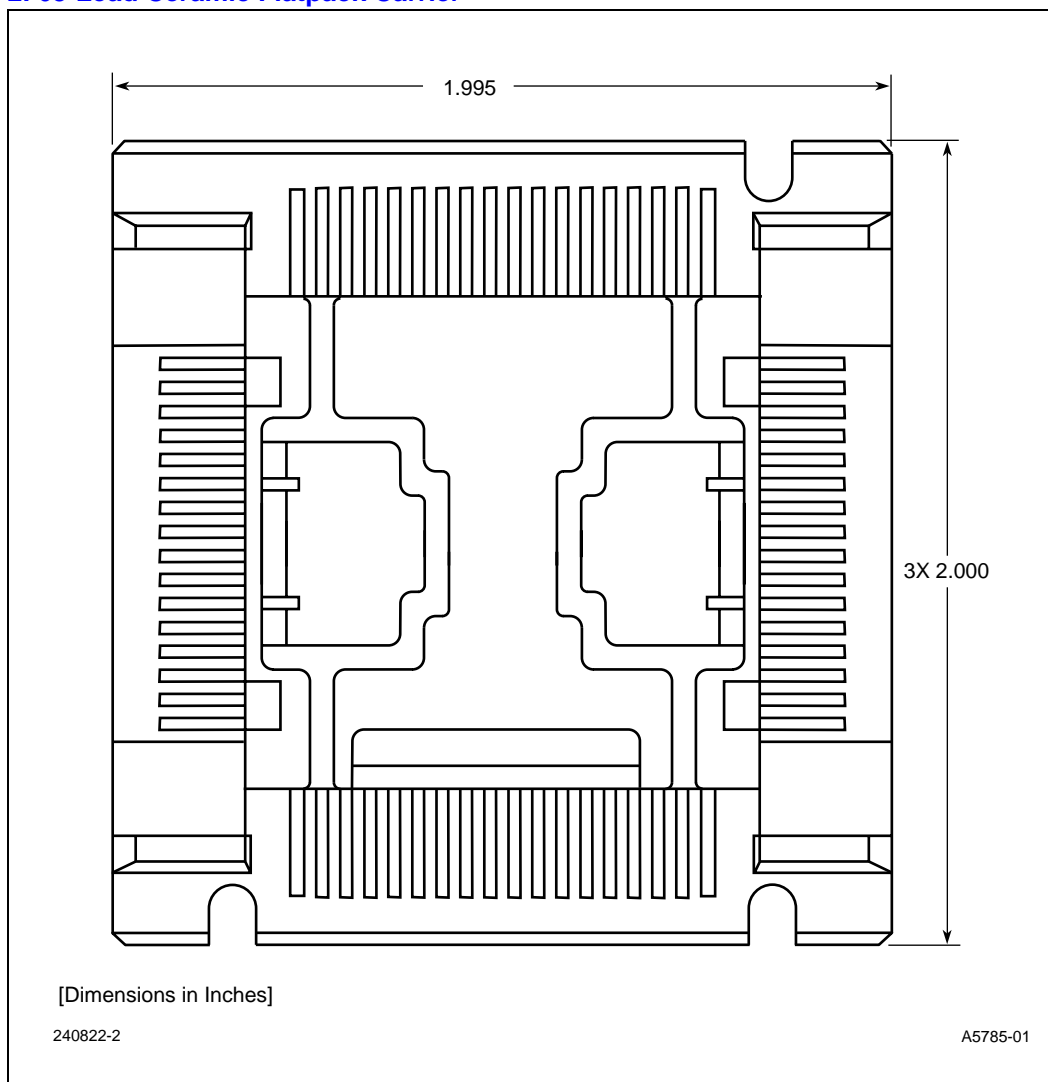
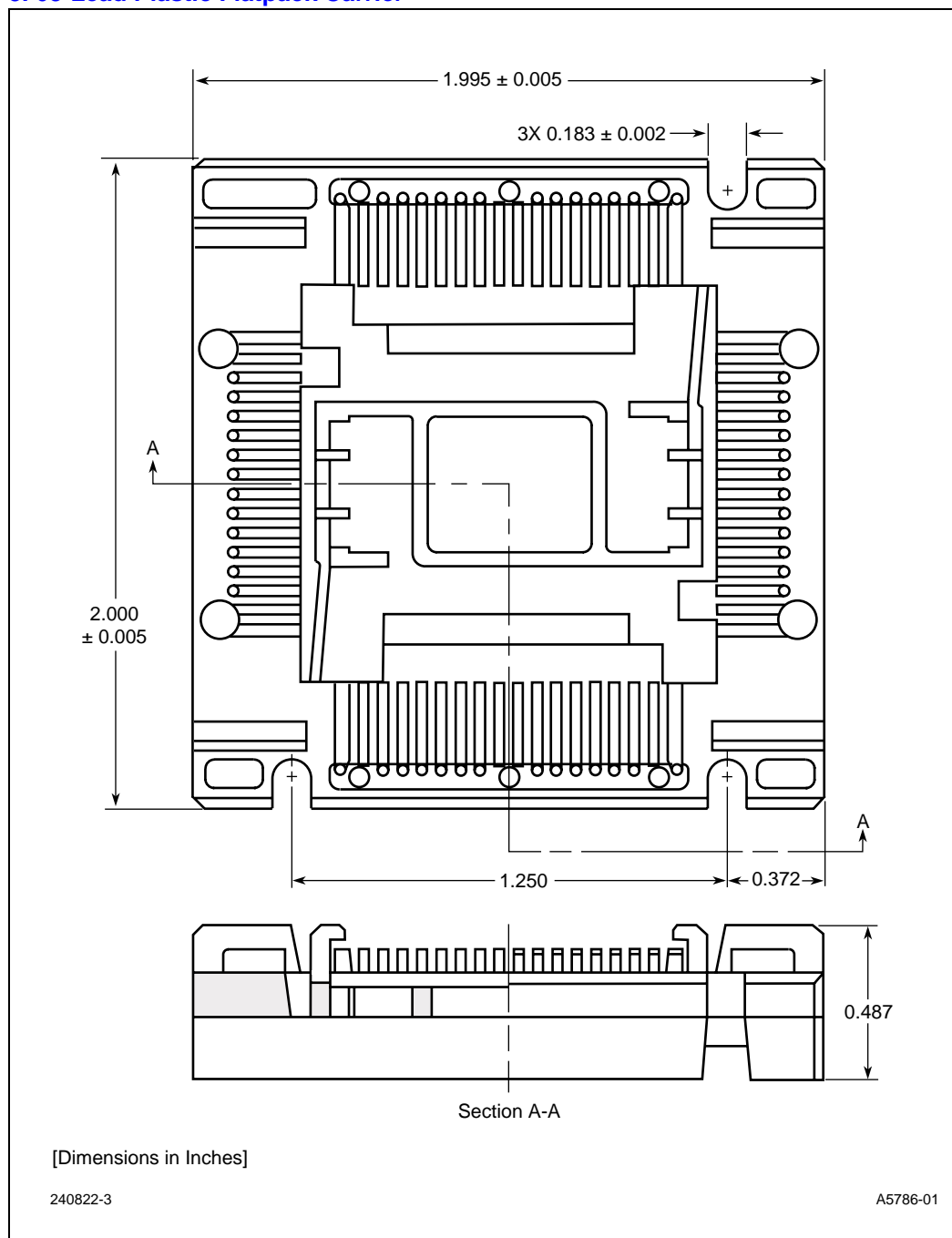
**Figure 10-2. 68-Lead Ceramic Flatpack Carrier**

Figure 10-3. 68-Lead Plastic Flatpack Carrier



### 10.1.3 Trays

Shipping trays are built in compliance with JEDEC thick and thin standard dimensions. Mid-temperature trays can be baked to  $140^{\circ}\text{C}$  while low temperature trays can withstand a maximum sustained temperature of  $65^{\circ}\text{C}$ . Trays are constructed in modified polysulfone (PS) or equivalent



for mid-temperature applications and polycarbonate (PC) for low temperature applications because of their high deflection temperature, superior strength, and dimensional stability. All JEDEC trays have the same “X” and “Y” dimensions and are easily stacked for storage and manufacturing.

Intel offers trays for the following package types:

PQFP	84LD, 100 LD, 132 LD, 164 LD, 196 LD thick mid-temperature 84 LD, 100 LD, 132 LD, 196 LD thin mid-temperature 132 LD, 196 LD single unit thick mid-temperature
PGA	68-84 LD 11 x 11, 88-100 LD 13 x 13, 132-139 LD 14 x 14, 149 LD 15 x 15, 168-208 LD 17 x 17, 240-296 LD 19 x 19, 273 LD 21 x 21, 325 LD 26 x 24 thick low-temperature
PLCC	28 LD square, 28 LD rectangular, 44 LD square, 68 LD square, 84 LD square thick high-temperature
TSOP	32 LD, 40 LD, 48 LD, 56 LD thick mid-temperature 32 LD, 40 LD, 56 LD thin mid-temperature
SSOP	48 LD, 56 LD thick mid-temperature
CQFP	132 LD formed, 164 LD flat, 196 LD formed, 196 LD flat thick high-temperature
MQFP	44 LD (10 x 10), 64 LD (12 x 12), 80/100 LD (14 x 20) thick and thin mid-temperature
SQFP	80 LD (12 x 12), 100 LD (14 x 14), 208 LD (28 x 28) thick and thin mid-temperature, 208 LD (28 x 28), single unit thick mid-temperature
TQFP	144 LD (20 x 20), 176 LD (24 x 24) thick and thin mid-temperature TCP carrier high-temperature
MSC	19 x 19, 0.880 high spacer low-temperature TCP carrier high-temperature
BGA	27 x 27 and 35 x 35 thin mid-temperature
PPGA	296 LD thick low temperature
μBGA	40B (12x22) and 48B (9x18) thin mid-temperature

Illustrations of trays for various packages are shown on the following pages. Intel field sales engineers can provide detailed drawings and specifications upon request.

Figure 10-4. Injection Molded Thick JEDEC Tray

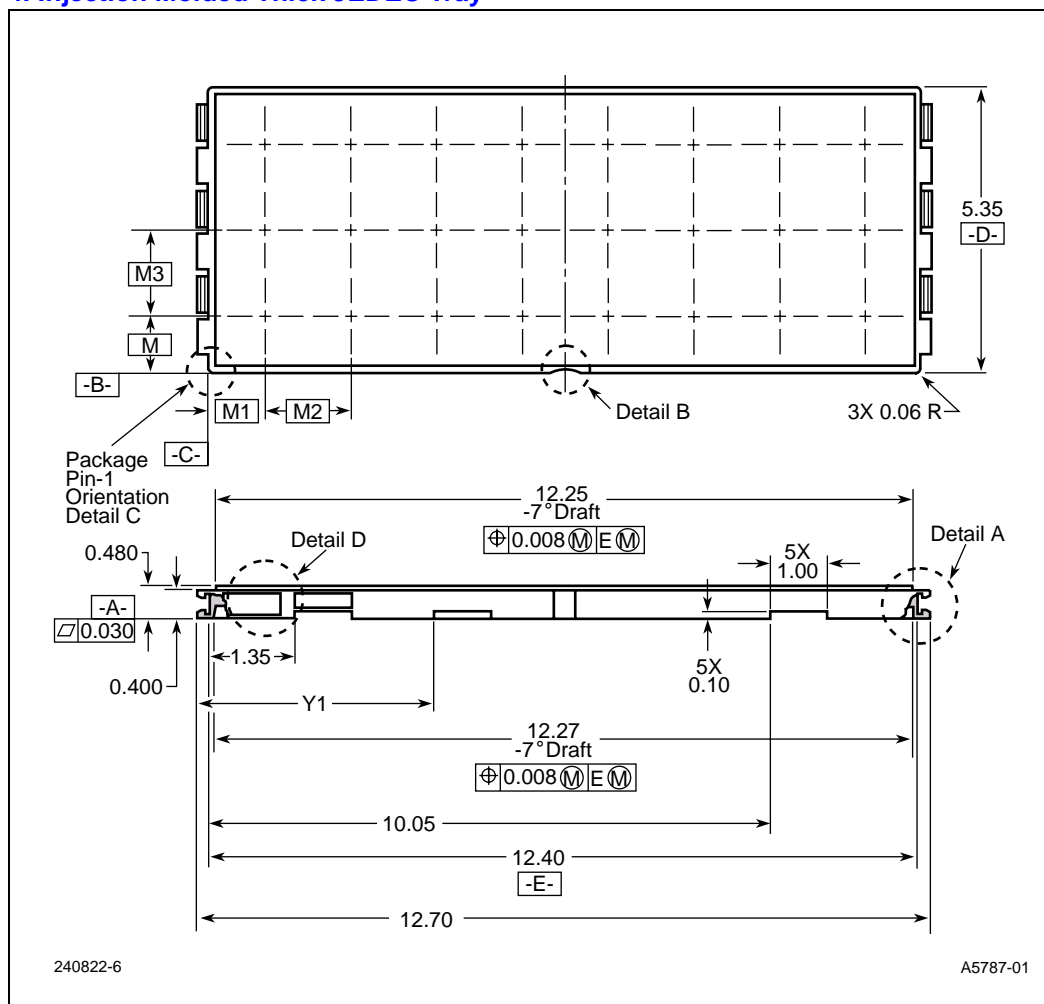
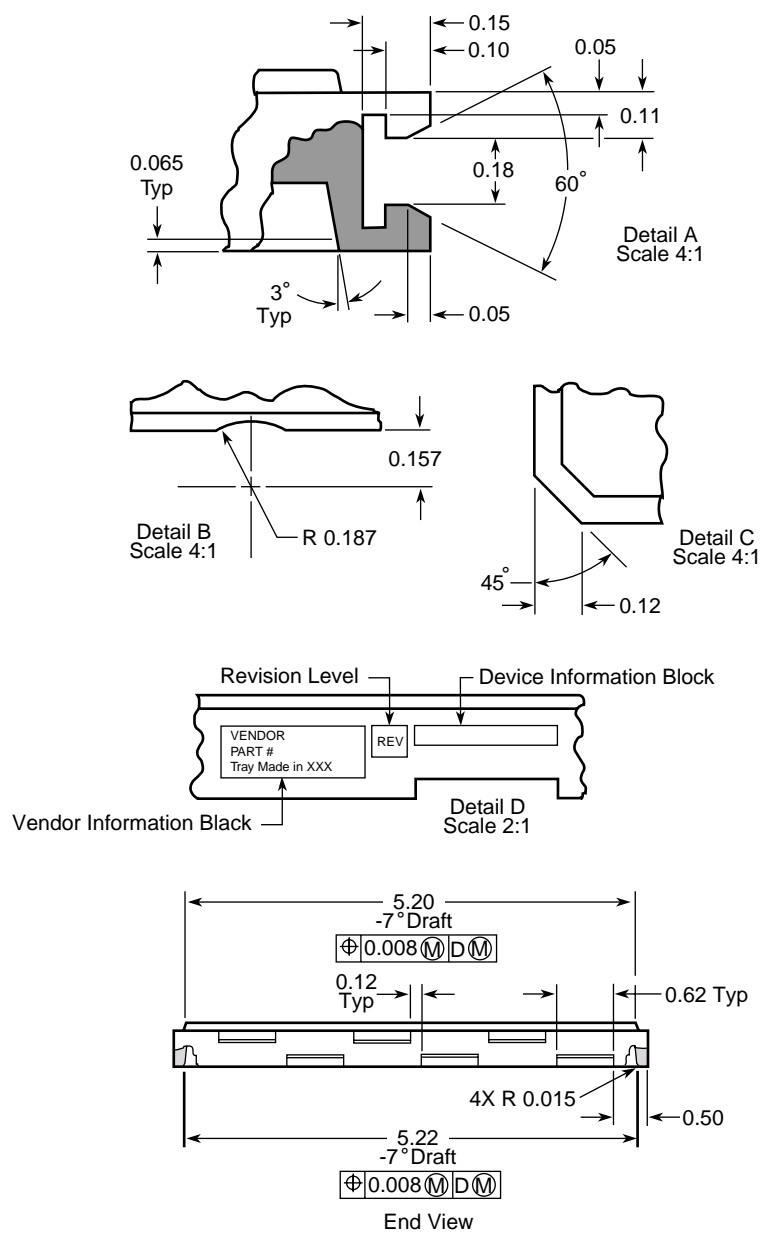


Figure 10-5. Injection Molded Thick JEDEC Tray



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Figure 10-6. Injection Molded Thin JEDEC Tray

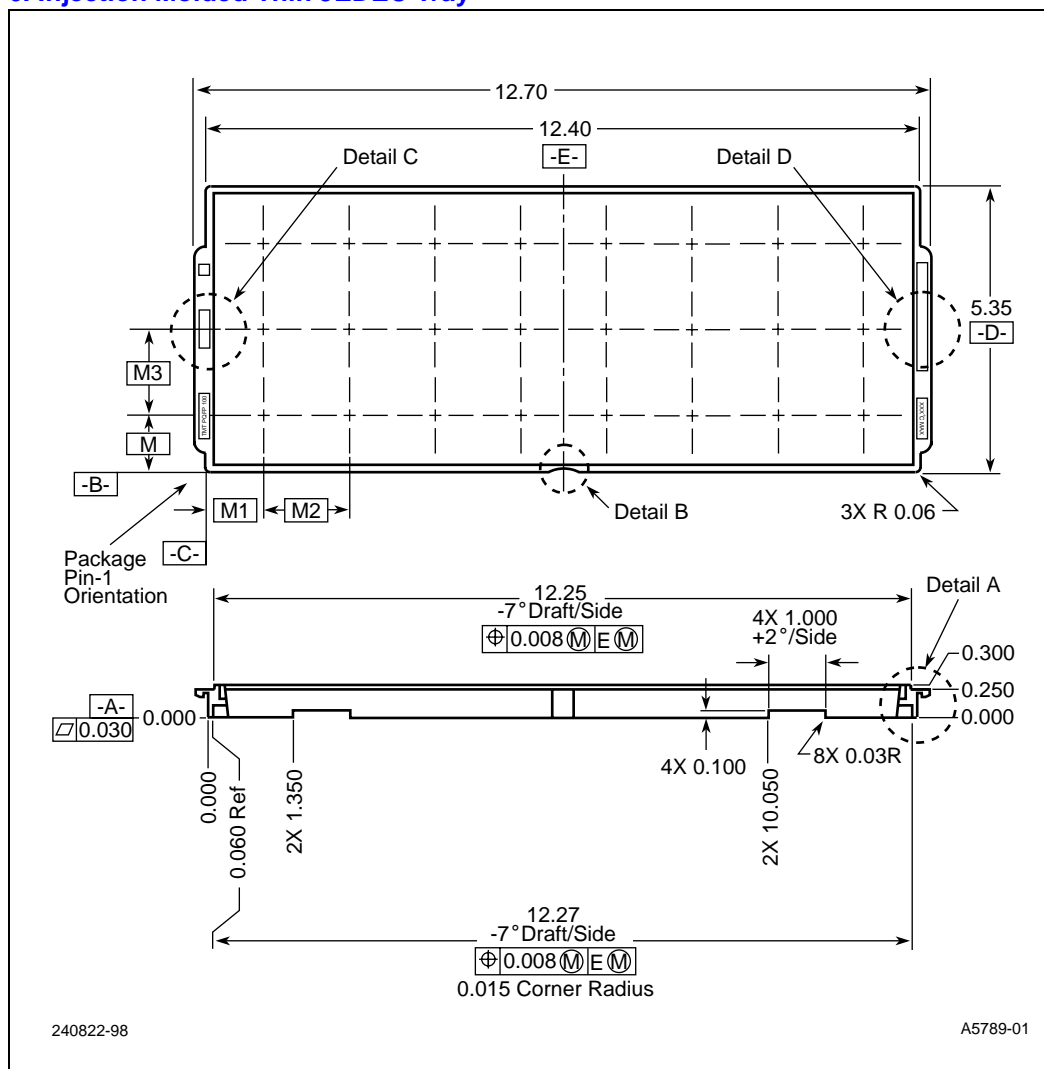


Figure 10-7. Injection Molded Thin JEDEC Tray

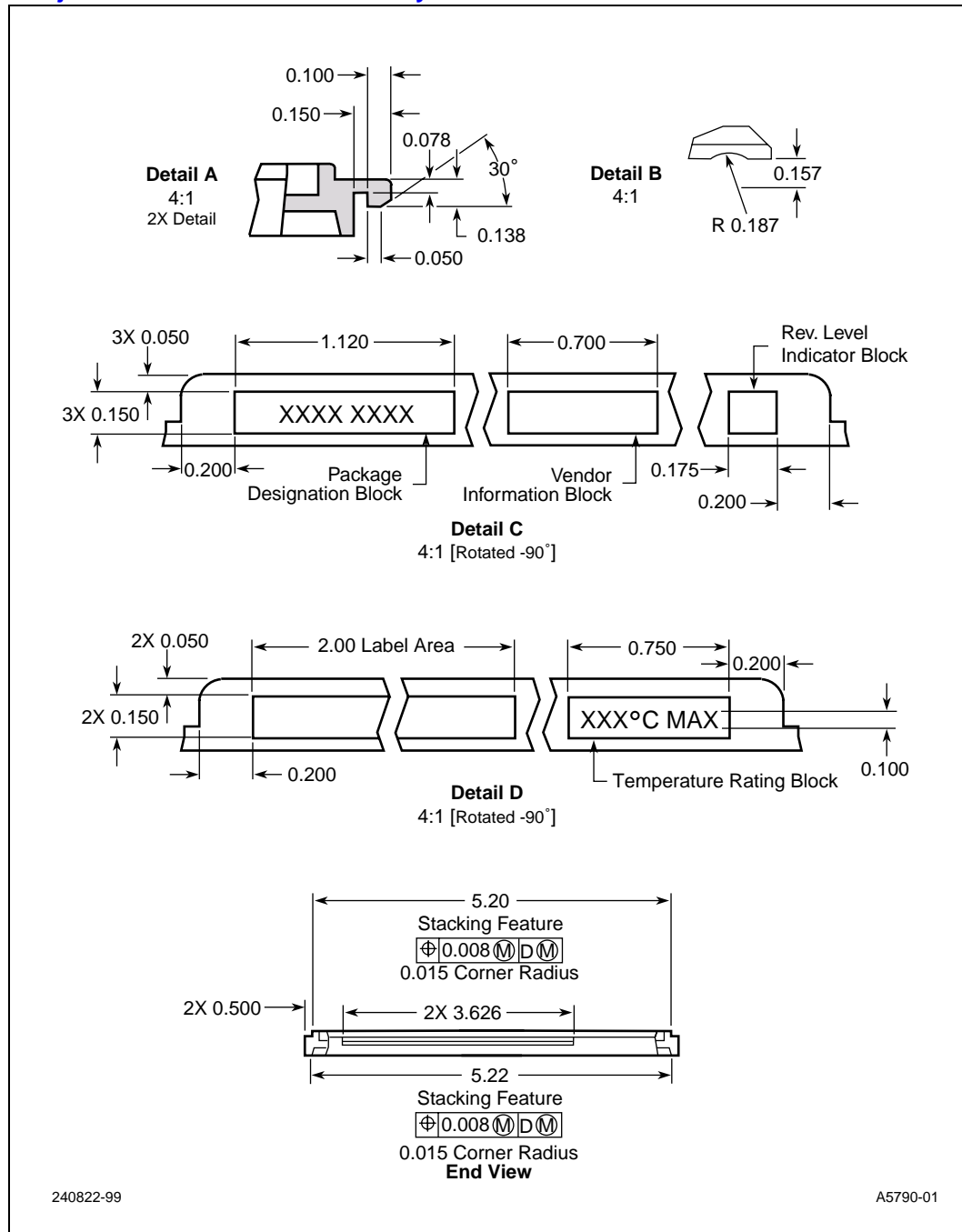
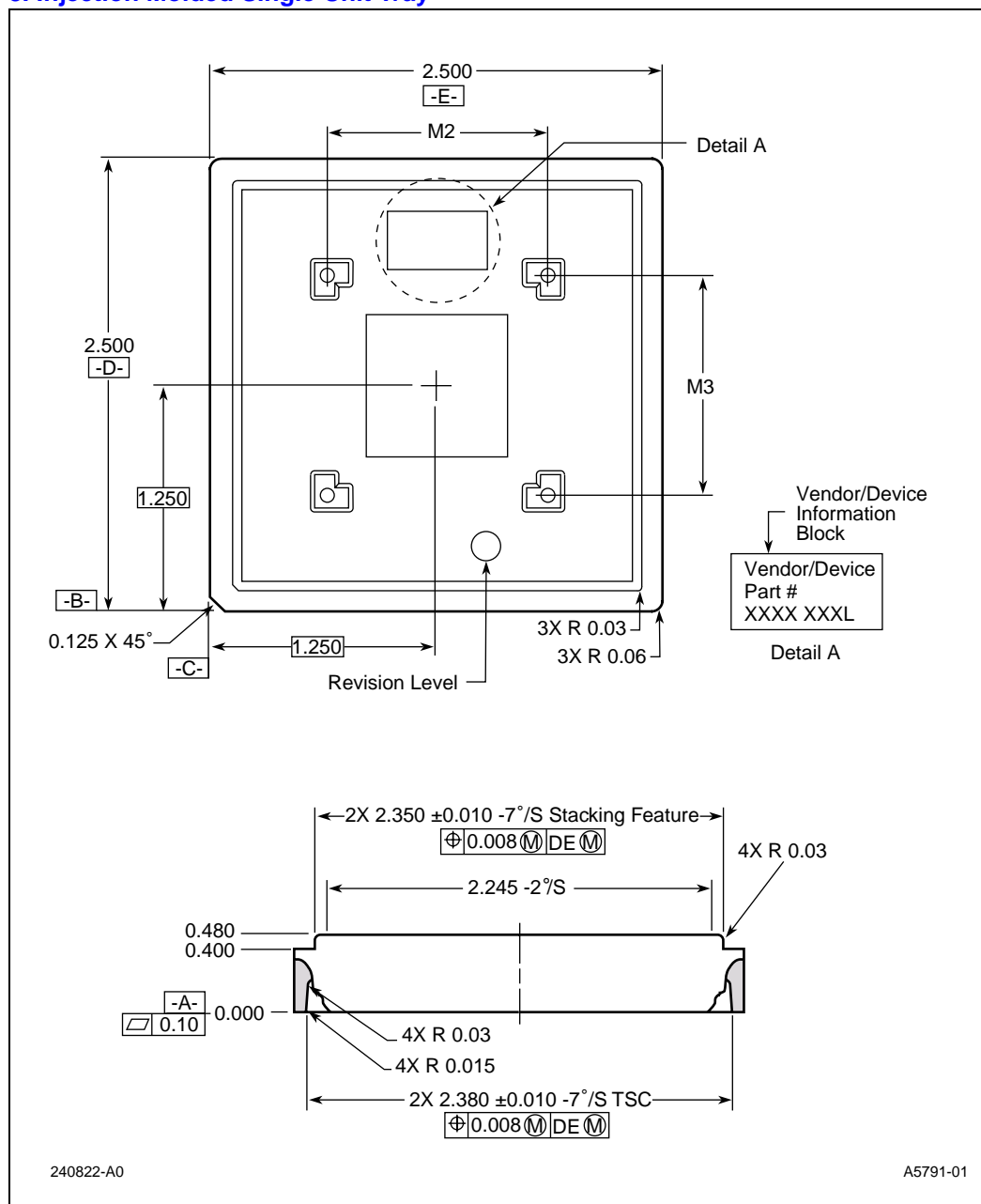


Figure 10-8. Injection Molded Single Unit Tray



**Table 10-9. Injection Molded Thick and Thin PQFP JEDEC Tray**

PQFP Tray Dimensions						
Pocket Locations	Symbol	84 LD	100 LD	132 LD	164 LD	196 LD
Pocket Cntr Location to Edge Y	M	0.701	0.701	0.824	1.161	1.030
Pocket Cntr Location to Edge X	M1	0.706	0.750	0.944	0.957	1.064
Pocket-Pocket Cntr Distance X	M2	0.999	1.090	1.314	1.498	1.712
Pocket-Pocket Cntr Distance Y	M3	0.987	0.987	1.234	1.514	1.645
# of Rows of Pockets	Rows	5	5	4	3	3
# of Columns of Pockets	Columns	12	11	9	8	7
Total # of Pockets	Pockets	60	55	36	24	21

**NOTE:**

1. Dimensions are in inches.

**Table 10-10. Injection Molded Thick PGA JEDEC Tray**

PGA Tray Dimensions								
Pocket Locations	Symbol	68 L	88 L	132 L	168L	240/ 296L	273 L	325/ 387L
Pocket Cntr Location to Edge Y	M	1.072	1.573	1.556	1.506	1.473	1.456	2.675
Pocket Cntr Location to Edge X	M1	1.152	1.077	1.285	1.513	1.446	1.861	1.700
Pocket-Pocket Cntr Distance X	M2	1.683	1.708	1.966	2.344	2.377	2.892	3.000
Pocket-Pocket Cntr Distance Y	M3	1.603	2.204	2.237	2.337	2.404	2.438	N/A
# of Rows of Pockets	Rows	3	2	2	2	2	2	1
# of Columns of Pockets	Columns	7	7	6	5	5	4	4
Total # of Pockets	Pockets	21	14	12	10	10	8	4

**NOTE:**

1. Dimensions are in inches.

**Table 10-11. Injection Molded Thick PLCC JEDEC Tray**

PLCC Tray Dimensions						
Pocket Locations	Symbol	PLCC 28 LD(R)	PLCC 28 LD(S)	PLCC 44 LD(S)	PLCC 68 LD(S)	PLCC 84 LD(S)
Pocket Cntr Location to Edge Y	M	0.670	0.767	0.899	1.079	1.070
Pocket Cntr Location to Edge X	M1	0.755	0.880	0.890	1.163	1.148
Pocket-Pocket Cntr Distance X	M2	0.990	1.064	1.180	1.679	1.684
Pocket-Pocket Cntr Distance Y	M3	0.802	0.954	1.184	1.596	1.605
# of Rows of Pockets	Rows	6	5	4	3	3
# of Columns of Pockets	Columns	12	11	10	7	7
Total # of Pockets	Pockets	72	55	40	21	21

**NOTE:**

1. Dimensions are in inches.

Table 10-12. SOP Thick Tray Physical Dimensions

Pocket Locations	Symbol	48-Lead SSOP	56-Lead SSOP
Pocket Cntr Location to Edge Y	M	15.8	13.61
Pocket Cntr Location to Edge X	M1	15	29.46
Pocket-Pocket Cntr Distance X	M2	19	32.00
Pocket-Pocket Cntr Distance Y	M3	14.9	18.11
# of Rows	Rows	8	7
# of Columns	Columns	16	9
Total # of Pockets	Pockets	128	63

**NOTE:**

1. Dimensions are in millimeters.

Table 10-13. Thin High Density SOP Tray Dimensions

Pocket Locations	Symbol	32-Lead TSOP	40-Lead TSOP	48-Lead TSOP	56-Lead TSOP
Pocket Cntr Location to Edge Y	M	8.53	14.40	15.80	13.00
Pocket Cntr Location to Edge X	M1	17.25	17.25	17.25	17.24
Pocket-Pocket Cntr Distance X	M2	25.50	25.50	25.50	25.50
Pocket-Pocket Cntr Distance Y	M3	9.90	11.89	14.90	15.69
# of Rows of Pockets	Rows	12	12	12	12
# of Columns of Pockets	Columns	13	10	8	8
Total # of Pockets	Pockets	156	120	96	96

**NOTE:**

1. Dimensions are in millimeters.

Table 10-14. Injection Molded Thick Formed CQFP JEDEC Tray

CQFP Tray Dimensions			
Pocket Locations	Symbol	132 LEAD	196 LEAD
Pocket Cntr Location to Edge Y	M	0.824	1.030
Pocket Cntr Location to Edge X	M1	0.944	1.064
Pocket-Pocket Cntr Distance X	M2	1.314	1.712
Pocket-Pocket Cntr Distance Y	M3	1.234	1.645
# of Rows of Pockets	Rows	4	3
# of Columns of Pockets	Columns	9	7
Total # of Pockets	Pockets	36	21

**NOTE:**

1. Dimensions are in inches.



**Table 10-15. Injection Molded Thick Formed CQFP JEDEC Tray**

CQFP Flat Leads Tray Dimensions			
Pocket Locations	Symbol	164 LEAD	132/196 LEAD
Pocket Cntr Location to Edge Y	M	2.675	2.675
Pocket Cntr Location to Edge X	M1	1.700	1.700
Pocket-Pocket Cntr Distance X	M2	3.000	3.000
Pocket-Pocket Cntr Distance Y	M3	—	—
# of Rows of Pockets	Rows	1	1
# of Columns of Pockets	Columns	4	4
Total # of Pockets	Pockets	4	4

**NOTE:**

1. Dimensions are in inches.

**Table 10-16. Injection Molded Thick and Thin MQFP JEDEC Tray**

MQFP Thick and Thin Tray Dimensions					
Pocket Locations	Symbol	44 LD (10x 10)	64 LD (12 x 12)	80/100 (14 x 20) Thick	80/100 (14 x 20) Thin
Pocket Cntr Location to Edge Y	M	0.720	0.608	0.843	0.608
Pocket Cntr Location to Edge X	M1	0.680	0.701	1.034	0.886
Pocket-Pocket Cntr Distance X	M2	0.736	0.846	1.148	1.063
Pocket-Pocket Cntr Distance Y	M3	0.782	0.827	0.916	0.827
# of Rows of Pockets	Rows	6	6	5	6
# of Columns of Pockets	Column	16	14	10	11
Total # of Pockets	Pockets	96	84	50	68

**NOTE:**

1. Dimensions are in inches.

**Table 10-17. Injection Molded Thick and Thin SQFP JEDEC Tray**

SQFP Thick and Thin Tray Dimensions				
Pocket Locations	Symbol	80 LD (12 x12)	100 LD (14 x 14)	208 LD (28 x 28)
Pocket Cntr Location to Edge Y	M	0.608	0.608	1.218
Pocket Cntr Location to Edge X	M1	0.701	0.701	1.100
Pocket-Pocket Cntr Distance X	M2	0.846	0.846	1.457
Pocket-Pocket Cntr Distance Y	M3	0.827	0.827	1.457
# of Rows of Pockets	Rows	6	6	3
# of Columns of Pockets	Columns	14	14	8
Total # of Pockets	Pockets	84	84	24

**NOTE:**

1. Dimensions are in inches.

**Table 10-18. Injection Molded Thick Formed TQFP JEDEC Tray**

<b>TQFP Thick and Thin Tray Dimensions</b>			
<b>Pocket Locations</b>	<b>Symbol</b>	<b>144 LD (20 x 20)</b>	<b>176 LD (24 x 24)</b>
Pocket Cntr Location to Edge Y	M	0.691	0.815
Pocket Cntr Location to Edge X	M1	0.701	0.815
Pocket-Pocket Cntr Distance X	M2	1.000	1.197
Pocket-Pocket Cntr Distance Y	M3	0.992	1.240
# of Rows of Pockets	Rows	5	4
# of Columns of Pockets	Columns	12	10
Total # of Pockets	Pockets	60	40

**NOTE:**

1. Dimensions are in inches.

**Table 10-19. Injection Molded MSC JEDEC Tray**

<b>Pocket Locations</b>	<b>Symbol</b>	<b>19 x 19 - 0.880</b>	<b>TCP Carrier</b>
Pocket Cntr Location to Edge Y	M	1.473	1.415
Pocket Cntr Location to Edge X	M1	1.446	1.667
Pocket-Pocket Cntr Distance X	M2	2.377	3.022
Pocket-Pocket Cntr Distance Y	M3	2.404	2.521
# of Rows of Pockets	Rows	2	2
# of Columns of Pockets	Columns	5	4
Total # of Pockets	Pockets	10	8
Tray Height	Height	0.880	0.480

**NOTE:**

1. Dimensions are in inches.

**Table 10-20. Injection Molded Thin BGA JEDEC Tray**

<b>BGA Thin Tray Dimensions</b>			
<b>Pocket Locations</b>	<b>Symbol</b>	<b>27 x 27</b>	<b>35 x 35</b>
Pocket Cntr Location to Edge Y	M	24.15	29.29
Pocket Cntr Location to Edge X	M1	26.10	24.50
Pocket-Pocket Cntr Distance X	M2	29.20	38.00
Pocket-Pocket Cntr Distance Y	M3	29.20	38.00
# of Rows of Pockets	Rows	4	3
# of Columns of Pockets	Columns	10	8
Total # of Pockets	Pockets	40	24

**NOTE:**

1. Dimensions are in millimeters.

**Table 10-21. Injection Molded Thick PPGA JEDEC Tray**

PPGA Thick Tray Dimensions		
Pocket Locations	Symbol	296 Lead
Pocket Cntr Location to Edge Y	M	1.473
Pocket Cntr Location to Edge X	M1	1.448
Pocket-Pocket Cntr Distance X	M2	2.377
Pocket-Pocket Cntr Distance Y	M3	2.404
# of Rows of Pockets	Rows	2
# of Columns of Pockets	Columns	5
Total # of Pockets	Pockets	10

**NOTE:**

1. Dimensions are in millimeters.

**Table 10-22. CSP Injection Molded Thin JEDEC Tray**

μBGA Thin Tray Dimensions									
Pocket Locations	Symbol	28F008S3	28F016S3	28F008B3 28F008B3	28F160B3 28F016B3	28F160B3A 28F016B3A 28F160C3 28F160F3	28F320B3 28F320C3	28F160C18	28F640J5
Pocket Cntr Location to Edge Y	M	17.246	12.052	12.390	13.386	18.9	15.7	11.85	13.386
Pocket Cntr Location to Edge X	M1	16.129	12.128	11.532	12.522	8.7	8.7	9.00	19.380
Pocket-Pocket Cntr Distance X	M2	13.462	19.380	15.367	17.043	12.4	12.4	11.00	25.121
Pocket-Pocket Cntr Distance Y	M3	9.220	12.420	13.919	13.640	10.9	9.5	10.20	13.640
# of Columns of Pockets	Columns	22	16	20	18	25	25	28	12
# of Rows of Pockets	Rows	12	10	9	9	10	12	12	9
Total # of Pockets	Pockets	264	160	180	162	250	300	336	108

**Table 10-23. Easy BGA Package Thin Tray Dimensions**

<b>Pocket Locations</b>	<b>Symbol</b>	<b>All Products</b>
Pocket Cntr Location to Edge Y	M	19.30
Pocket Cntr Location to Edge X	M1	14.70
Pocket-Pocket Cntr Distance X	M2	16.80
Pocket-Pocket Cntr Distance Y	M3	13.90
# of Columns of Pockets	Columns	8
# of Rows of Pockets	Rows	18
Total # of Pockets	Pockets	144

**Table 10-24. S-CSP Package Thin Tray Dimensions**

<b>Pocket Locations</b>	<b>Symbol</b>	<b>28F1602C3</b>	<b>28F1604C3 28F3202C3 28F3204C3</b>
Pocket Cntr Location to Edge Y	M	20.00	14.40
Pocket Cntr Location to Edge X	M1	14.70	14.70
Pocket-Pocket Cntr Distance X	M2	11.90	11.90
Pocket-Pocket Cntr Distance Y	M3	13.70	15.30
# of Columns of Pockets	Columns	8	8
# of Rows of Pockets	Rows	25	25
Total # of Pockets	Pockets	200	200

**Table 10-25. Injection Molded OLGA JEDEC Style Tray Dimensions**

<b>Pocket Locations</b>	<b>Symbol</b>	<b>31 x 31</b>	<b>31 x 35</b>	<b>27.2 x 31</b>	<b>42.5 x 42.5</b>
Pocket Cntr Location to Edge Y	M	24.15	24.15	18.74	35.10
Pocket Cntr Location to Edge X	M1	19.50	21.69	19.50	28.25
Pocket-Pocket Cntr Distance X	M2	34.50	38.78	34.49	51.70
Pocket-Pocket Cntr Distance Y	M3	43.80	43.79	32.79	65.70
# of Columns of Pockets	Columns	9	8	9	6
# of Rows of Pockets	Rows	3	3	4	2
Total # of Pockets	Pockets	27	24	36	12
Tray height	Height	7.62	12.19	7.62	12.19

**Table 10-26. Injection Molded FC-PGA JEDEC Style Tray Dimensions**

<b>Pocket Locations</b>	<b>Symbol</b>	<b>49.53 x 49.53</b>
Pocket Cntr Location to Edge Y	M	37.41
Pocket Cntr Location to Edge X	M1	36.72
Pocket-Pocket Cntr Distance X	M2	60.39
Pocket-Pocket Cntr Distance Y	M3	61.08
# of Columns of Pockets	Columns	5
# of Rows of Pockets	Rows	2
Total # of Pockets	Pockets	10
Tray Height	Height	7.62

**Table 10-27. Injection Molded OOI JEDEC Style Tray Dimensions**

<b>Pocket Locations</b>	<b>Symbol</b>	<b>34.22 x 28.25</b>	<b>32.6 x 36.8</b>
Pocket Cntr Location to Edge Y	M	18.75	24.15
Pocket Cntr Location to Edge X	M1	21.70	24.43
Pocket-Pocket Cntr Distance X	M2	38.80	44.35
Pocket-Pocket Cntr Distance Y	M3	32.80	43.79
# of Columns of Pockets	Columns	8	7
# of Rows of Pockets	Rows	4	3
Total # of Pockets	Pockets	32	20
Tray Height	Height	7.62	7.62

**Table 10-28. MMAP Thick Tray Physical Dimensions**

<b>Pocket Locations</b>	<b>Symbol</b>	<b>8x8</b>
Pocket Cntr Location to Edge Y	M	12.95
Pocket Cntr Location to Edge X	M1	12.5
Pocket-Pocket Cntr Distance X	M2	10
Pocket-Pocket Cntr Distance Y	M3	10
# of Columns of Pockets	Columns	12
# of Rows of Pockets	Rows	12
Total # of Pockets	Pockets	30
Tray Height	Height	360

## 10.2 Environmental Programs Overview:

Intel continues to evaluate current packaging methodologies to ensure that we meet or exceed global regulatory compliance with regards to environmental concerns. Our philosophy focuses on eliminating redundant or mixed materials as appropriate, implementing reuse applications and increasing the recyclability of our component packaging material. This chapter also contains information for recycling of the transport media materials listed after each section. For the latest information regarding reuse or recycling programs call 1-800-628-8686.

### 10.2.1 Intel's Shipping Media Reuse Programs

#### 10.2.1.1 JEDEC Tray Reuse Program

Intel has been successful in establishing a program for reuse of our low/high temperature JEDEC Trays. Not only does the program offer a nominal cash reimbursement but it lowers the cost of plastic shipping trays, employs several handicapped agencies and reduces environmental waste. JEDEC trays can now be returned for reuse at Intel through a variety of methods. To ensure trays are returned in a usable condition, trays should be placed in corrugated containers and palletized if volumes warrant. All containers should be labeled with the return address.

All trays are subjected to a variety of inspections to ensure they meet Intel's specifications prior to reuse by an Intel factory. Non-Intel trays or trays that fail to meet Intel's quality requirements are sent to plastic reclamation vendors for utilization in other plastic applications. No trays are sent to land fills.

#### 10.2.1.2 Intel's Die Sales and Gel-Pak Reuse Program

Intel utilizes Gel-Paks as a method for transporting bare die from Intel to the end customer. The Gel-Paks are placed in Moisture Barrier bags with a desiccant card to absorb moisture and sealed. Gel-Paks can be reclaimed and reused. The reuse program for Gel-Paks changes depending on the region and the volumes involved. Please contact your local sales representative for details on how to reuse this shipping media

For further details on Intel's wafer and die sales procedures, refer to Chapter 18 of this Intel Packaging Databook. .

Further information on GelPaks are available at: [www.gelpak.com](http://www.gelpak.com)

#### 10.2.1.3 Reel Reuse Program

Intel has established a Reel Reuse Program and encourages the return of reels using recyclers. Contact your local sales representative for details on how to recycle the shipping media.

Figure 10-9. Carrier Tape

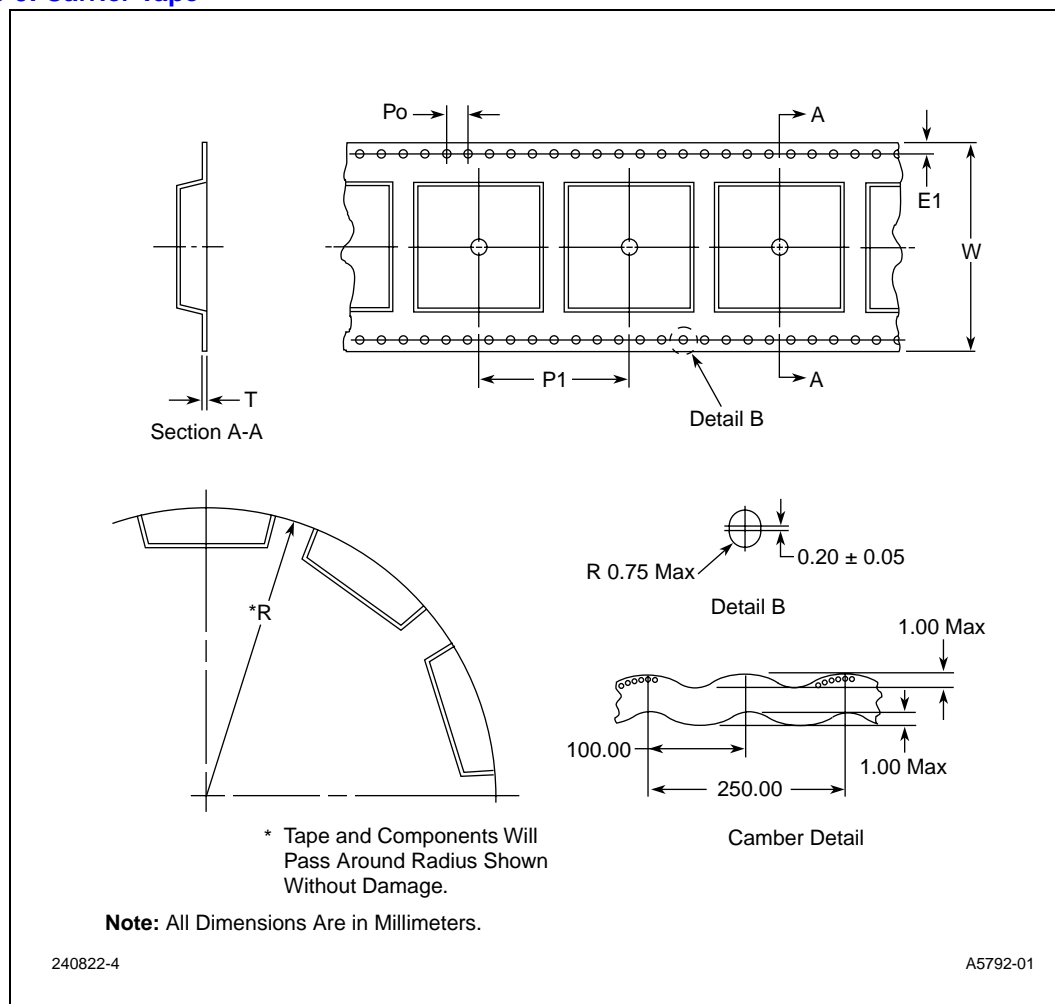


Table 10-32. Carrier Tape Dimensions by Package

Package Type	Tape Size	E1	Single/ Double Sprocket	PO	P1	R	T	W	Units/ Reel
PLCC 20 LD	16 mm	1.65-1.85	Single	3.9-4.1	11.9-12.1	30 MIN	.25-3.5	15.7-16.3	1000
28 LD (REC)	24 mm	1.65-1.85	Single	3.9-4.1	11.9-12.1	30 MIN	.25-3.5	23.7-24.3	750
28 LD (SQ)	24 mm	1.65-1.85	Single	3.9-4.1	15.9-16.1	30 MIN	.25-3.5	23.7-24.3	750
32 LD (REC)	24 mm	1.65-1.85	Single	3.9-4.1	15.9-16.1	30 MIN	.25-3.5	23.7-24.3	750
44 LD	32 mm	1.65-1.85	Double	3.9-4.1	23.9-24.1	50 MIN	.25-3.5	31.7-32.3	500
52 LD	32 mm	1.65-1.85	Double	3.9-4.1	23.9-24.1	50 MIN	.25-3.5	31.7-32.3	500
68 LD	44 mm	1.65-1.85	Double	3.9-4.1	31.9-32.1	50 MIN	.25-3.5	43.7-44.3	350
84 LD	44 mm	1.65-1.85	Double	3.9-4.1	35.9-36.1	50 MIN	.25-3.5	43.7-44.3	250
PQFP84 LD	32 mm	1.65-1.85	Double	3.9-4.1	27.9-28.1	50 MIN	.25-3.5	31.7-32.3	500
100 LD	44 mm	1.65-1.85	Double	3.9-4.1	31.9-32.1	50 MIN	.25-3.5	43.7-44.3	300
132 LD	44 mm	1.65-1.85	Double	3.9-4.1	31.9-32.1	50 MIN	.25-3.5	43.7-44.3	250
TSOP32 LD	32 mm	1.65-1.85	Double	3.9-4.1	15.9-16.1	50 MIN	.25-3.5	31.7-32.3	2000
40 LD	32 mm	1.65-1.85	Double	3.9-4.1	15.9-16.1	50 MIN	.25-3.5	31.7-32.3	2000
48 LD	32 mm	1.65-1.85	Double	3.9-4.1	15.9-16.1	50 MIN	.25-3.5	31.7-32.3	2000
56 LD	32 mm	1.65-1.85	Double	3.9-4.1	19.9-20.1	50 MIN	.25-3.5	31.7-32.3	1600
PSOP44 LD	44 mm	1.65-1.85	Double	3.9-4.1	31.9-32.1	89 MIN	.25-3.5	43.7-44.3	450
SSOP56 LD	44 mm	1.65-1.85	Double	3.9-4.1	23.9-24.1	89 MIN	.25-3.5	43.7-44.3	700
BGA 15 x 15	32mm	1.65-1.85	Double	3.9-4.1	19.1-20.1	50 MIN	.25-3.5	31.7-32.3	850
23 x 23	44mm	1.65-1.85	Double	3.9-4.1	31.9-32.1	89 MIN	.25-3.5	43.7-44.3	360
27 x 27	44 mm	1.65-1.85	Double	3.9-4.1	31.9-32.1	89 MIN	.25-.35	43.7-44.3	360
35 x 35	56 mm	1.65-1.85	Double	3.9-4.1	39.9-40.1	89 MIN	.25-.35	55.7-56.3	360
μBGA 28F008S3	12 mm	1.65-1.85	Single	3.9-4.1	11.9-12.1	50 MIN	.27-.29	11.9-12.3	
All other μBGA package variations	24 mm	1.65-1.85	Single	3.9-4.1	11.9-12.1	50 MIN	.32-.34	23.9-24.3	
All Easy BGA Products	24mm	1.75±.1	Single	4.0±.1	12.0±.1	50 MIN	.33± .02	24± 0.3/-0.1	
S-CSP 28F1602C3	24mm	1.75±.1	Single	4.0±.1	12.±.1	50 MIN	.33± .02	24± 0.3/-0.1	
S-CSP 28F1604C3 S-CSP 28F3202C3 S-CSP 28F3204C3	24mm	1.75±.1	Single	4.0±.1	16.0±.1	50 MIN	.33± .02	24± 0.3/-0.1	

**NOTE:**

1. Dimensions are in millimeters.



Figure 10-10. Carrier Tape Reel

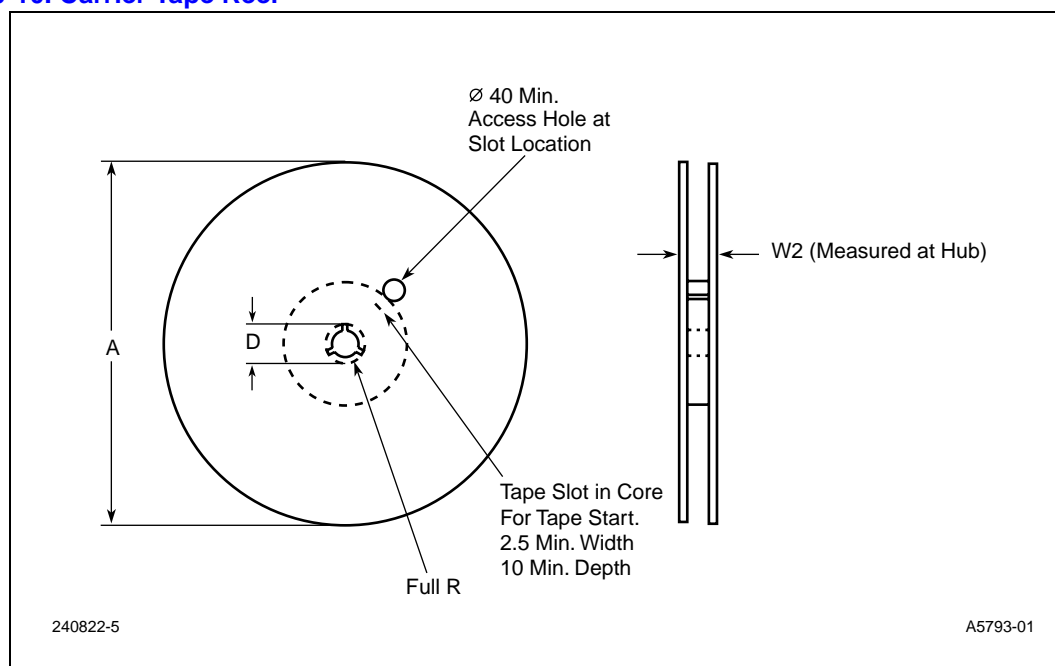


Table 10-33. Carrier Tape Reel Dimensions

Millimeters	12mm	16 mm	24 mm	32 mm	44 mm	56 mm
A Max.	330	330	330	330	330	609
D Min.	20.2	20.2	20.2	20.2	20.2	20.2
W2 Max.	16mm	22.4	30.4	38.4	50.4	62.4

**NOTE:**

1. Dimensions are in millimeters.

## 10.4 Protective Bands

To provide additional protection for product shipped in carrier tape, protective bands are wrapped inside the edges of the carrier tape reels. These bands consist of 1mm-thick strips of carbon-loaded polystyrene.

Table 10-34. Protective Band Dimensions

Carrier Tape Size	Protective Band Dimensions
24mm	24.2mm wide X 1.09 meters long
32mm	32.2mm wide X 1.09 meters long
44mm	44.2mm wide X 1.09 meters long

## 10.5 Shipping Formats

### 10.5.1 Desiccant Pack Materials

All PSMCs are shipped in desiccant pack. For a thorough discussion of the packing process (bake and bag) and handling considerations unique to PSMCs, refer to [Chapter 8, “Moisture Sensitivity/Desiccant Packaging/Handling of PSMCs”](#).

Intel uses the following materials in desiccant pack:

- **Moisture Barrier Bag (MBB).** Inside the shipping box is a moisture barrier bag containing components. The opaque MMB is constructed of three layers: a conductive polyethylene inner layer for sealing, an aluminum film mid-layer, and a tyvek outer layer. The bag meets MIL-STD-81705 TYPE I for electrostatic discharge (ESD) and mechanical stability. The measured water vapor transmission rate (WVTR) of the bag is better than the MIL-STD requirements for moisture protection. A “warning” label on the bag outlines precautions that should be taken with desiccant-packed units. A desiccant barcode label is also affixed to the bag.
- **Desiccant.** Each MBB contains one or more pouches of desiccant to absorb moisture that may be present in the bag. The desiccant is supplied in one-unit pouches. The number of pouches required is a function of the bag surface area. GelPaks use 3x4" desiccant cards.
- **Humidity Indicator Card (HIC).** Each MBB contains a humidity indicator card. This card is a military-standard moisture indicator and is included to show the user the approximate relative humidity (RH) level within the bag. The HIC is reversible and can be reused.
- **Labels.** The desiccant barcode label (shown in [Figure 10-11](#)) mentioned above in the section on MBB, contains the date that the bag was sealed (MM/DD/YY). The remaining storage life of the units in the bag is determined from this date. The “warning” label attached to the outside of the MBB outlines precautions that must be taken when handling desiccant-packed units if they are to be kept dry.
- **Shipping Box.** The barcode label on the shipping box indicates that desiccant-packed material is included. This label indicates the seal date of the enclosed MBB, and thus, the remaining shelf life.

### 10.5.2 Shipping Boxes and Cartons

Intel products are placed in tubes or trays, or on reels, then packed for shipment in a box made of corrugated fiberboard with an inner coating of conductive carbon that prevents electrostatic damage. Various materials, such as bubble wrap or antistatic foam end pads, are used for cushioning inside the box. Outer boxes are used for increased protection during shipping. All packing materials are either conductive, static dissipative, or antistatic, and meet the electrostatic discharge (ESD) requirements of EIA standard 541. All of the packing materials used can be recycled by any local recycling company. If details about a recycler are needed in your specific area, please contact your local Intel Field Sales Representative.

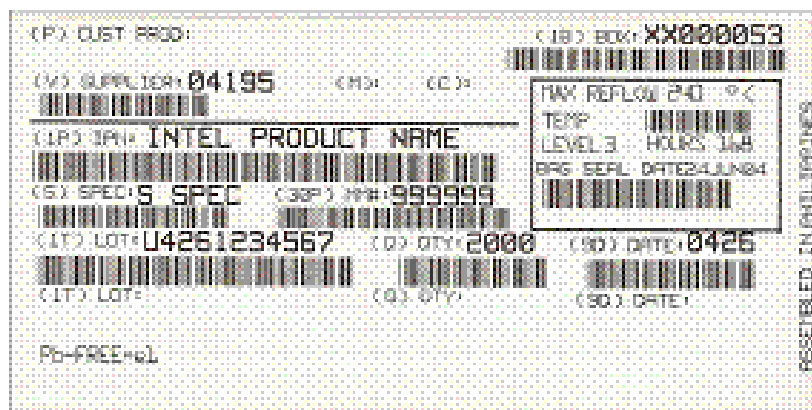
## 10.5.2 Shipping Boxes and Cartons (continued):

### 10.5.2.1

**Tube and Reel Labels.** Tube labels with information on lot traceability, part and spec numbers, quantity of parts, and ROM and PROM codes are available by special order. Reel labels are standard and provide the same information. Customer part number references also can be included on either type of label by special order.

- **Box Labels.** Bar-coded labels for each box are standard on Intel product shipments. Box labels provide all the information on the tube labels, show order packing and shipping information, and allow more space to define special requirements.

**Figure 10-11**



- The standard box and bag labels identify the parts as Pb-free (or with a 2<sup>nd</sup> Level interconnect that meets the requirement to be ROHS compliant) with the type of interconnect material, the peak reflow temperatures of the component, the quantity of parts in the box, the lot, and the pack dates.
- See chapter 17 of this Databook for further information on Pb-Free package marking and labeling.

## 10.6 Revision Summary

- Reviewed & updated tray information
- Reviewed & updated carrier tape information
- Removed recycler contacts and updated file (July 2004).